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CREATING A COUNTYWIDE SOLID WASTE MANAGEMENT SYSTEM. THE CASE STUDY OF HUMPHREYS COUNTY, TENNESSEE

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Creating a Countywide Solid Waste Management System

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CREATING A COUNTYWIDE SOLID WASTE MANAGEMENT SYSTEM

The Case Study of Humphreys County, Tennessee

This publication (SW-11C) was written

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CREATING A COUNTYWIDE SOLID WASTE MANAGEMENT SYSTEM:

The Case Study of Humphreys County, Tennessee

A B S T R A C T

Rural cities and counties need economical solid waste management systems that eliminate promiscuous and open dumps. This paper discusses the creation of one such system in Humphreys County, Tennessee. Three open burning dumps and approximately 40 promiscuous roadside dumps were eliminated, while the county developed a container collection system and a central sanitary landfill.

No Federal or State financial aid was used in the project. Capital costs (November 1970) for the container collection system were $58,091 and the estimated cost per ton of solid waste collected, including amortization is $7.25. The sanitary landfill capital costs were $39,318, including equipment and site preparation. Operating costs at the sanitary landfill are estimated to be $2.32 per ton of solid waste, including amortization.

Highlights of the project were a continuous public information system and rapid implementation. The lack of a written agreement for allocating operating costs at the sanitary landfill has been a source of difficulty. The experiences of Humphreys County should be carefully appraised by other agencies considering the creation of solid waste management systems in rural areas.

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CREATING A COUNTYWIDE SOLID WASTE MANAGEMENT SYSTEM:

The Case Study of Humphreys County, Tennessee

by Maurice A. Kruth,* David H. Booth,† and D.L. Yates‡

The Humphreys County, Tennessee, countywide solid waste management system is an outstanding example of how local action can find a satisfactory, economical solution to an area's solid waste management problems. Without State or Federal financial aid, Humphreys County established a countywide solid waste container collection system, a central sanitary landfill, and closed three open burning dumps. While patterned after the Chilton County, Alabama system, public acceptance and support have been even more evident for this project.

Background of the Area

Humphreys County is 65 miles southwest of Nashville in central Tennessee. Humphreys County had a 1970 population of 12,930 and has 555 square miles; three towns contained roughly 40 percent of the population: Waverly (3,680), McEwen (1,500), and New Johnsonville (900).

Kentucky Lake, which borders the county on the west, provides water transportation and access for industry.

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History of the Project

In January 1970, the Humphreys County Court, governing authority for the County, appointed a five-man solid waste study committee. Dorcie Yates, County Environmentalist, was elected chairman. The other members reflected the economic structure of the county: two were farmers; one represented industry; and one was a city alderman. Jerry Jolly, District Soils Conservationist with the U.S. Soil Conservation Service, acted as a special advisor to the group. The committee became active quickly and met at least once weekly.

Figure 1. One of many roadside dumps that were documented with slides and data to use in the public information program.

The committee documented the county's solid waste situation with slides and data (Figure 1) and provided the local radio station and newspaper with news of the progress and findings it made. David Booth, Director of Tennessee State Solid Waste Management Section, was contacted for advice and technical assistance.

In March 1970, the solid waste study committee visited Chilton County in Alabama to observe the countywide management system introduced there. Their container collection system and central sanitary landfill appeared adaptable to Humphreys County.

The committee reported its preliminary findings to the County Court in April 1970. Promiscuous dumping by its citizens and the operation of open burning dumps by each small town were the two main problem areas (Figure 2). Air pollution, odors, and vectors were common to all the disposal sites.

Figure 2. The McEwen city dump before it was closed and covered.

Upon initial examination of these findings, however, the reaction of the County Court was to table any action. Undaunted, the committee continued its public education programs. Local service clubs were visited by the committee members and pressure from the city governments upon the County Court grew, since municipal disposal problems were becoming more urgent.

By the July 1970 County Court meeting, Judge J. L. Bradley was convinced of the need for a countywide solid waste management system and he and the Board authorized the appropriation of $100,000 from general funds for the purchase of equipment. David Booth had estimated that this amount would be sufficient. The County's legal counsel advised the solid waste study committee that it did not have authority to spend county revenue. Consequently, a County Board of Sanitation was formed so that it could legally call for bids on equipment.

The public education program continued even after the project was approved. A slide show was presented at the County Fair to illustrate the local solid waste problems and the accomplishments of the Clean and Green Project in Chilton County, Alabama. The local radio station assisted by preparing a sound tape to accompany the slide series (Figure 3).

Enlarged, mounted pictures of the county's solid waste problems were another good visual arts technique that was used at the fair and speaking engagements.

Figure 3. Fairgoers at the Humphreys County Fair had an opportunity to see their own solid waste problems and to look at Chilton County's solution during a slide show.

Meanwhile, the search for an acceptable sanitary landfill site had begun. An 80-acre site was located three miles from Waverly that could be leased for $1.00 per year, if the county would build a one-mile access road. A 20-year lease was obtained, bids for equipment were let, and other preparations were made. On November 27,1970, the county solid waste management system began operations.

System Design and Operation

The solid waste collection and disposal system design was done by Don Shackelford of the Tennessee State Solid Waste Management Program. The experiences of Chilton County and the population of Humphreys County were the main design considerations. Actual capital expenditures were $94,409 (Table 1).

TABLE 1

CAPITAL COSTS AND SYSTEM COMPONENTS*

Item	Description	Cost
Packer truck	30-cu-yd Dempster, with automatic transmission	$31,453
Radio system	For packer truck	1,047
94 containers†	6-cu-yd, 10-gauge, Dempster	25,591
Capital costs for container collection		$58,091
Crawler tractor	Caterpillar D-5 with accessories	$30,613
Land for sanitary landfill		20≠
Site preparation, access road, fences, signs, and gate		8,685
Capital costs for sanitary landfill		$39,318
Total capital costs		$97,409

*Mention of commercial products does not constitute endorsement by the U.S. Government.

†Eleven additional containers were purchased for $3,830 and sold at cost to schools and local firms; they are not included in the figures shown above.

≠$1 per year for 20 years.

The County Road Department prepared the sanitary landfill site, (Figure 4), and its site preparation charges were included in capital costs (Table 1). The site preparation costs include funds expended for the access road required by the lease agreement.

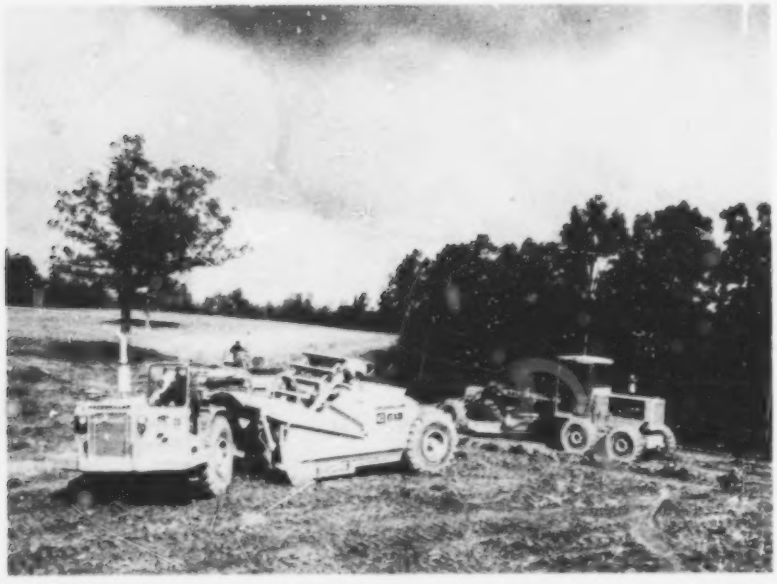

Figure 4. The sanitary landfill site was prepared by the Humphreys County Road Department.

Location of the containers was based on anticipated waste loads and estimated population densities (Figure 5). The containers were placed on wooden pads to keep them out of mud.

In a study by the TVA in March 1971, 212 container pickups were made in a typical 6-day week, when 101 containers were available in the system. The collection vehicle covered each of the six half-day routes twice and traveled 685 miles during the week (Figure 6). Preliminary figures from this survey indicated that an average of 2.5 pounds of solid waste was collected for each person per day. The actual municipal solid waste generation rate is estimated to be 3.5 pounds per person per day, since some citizens and businesses transport solid wastes directly to the sanitary landfill.

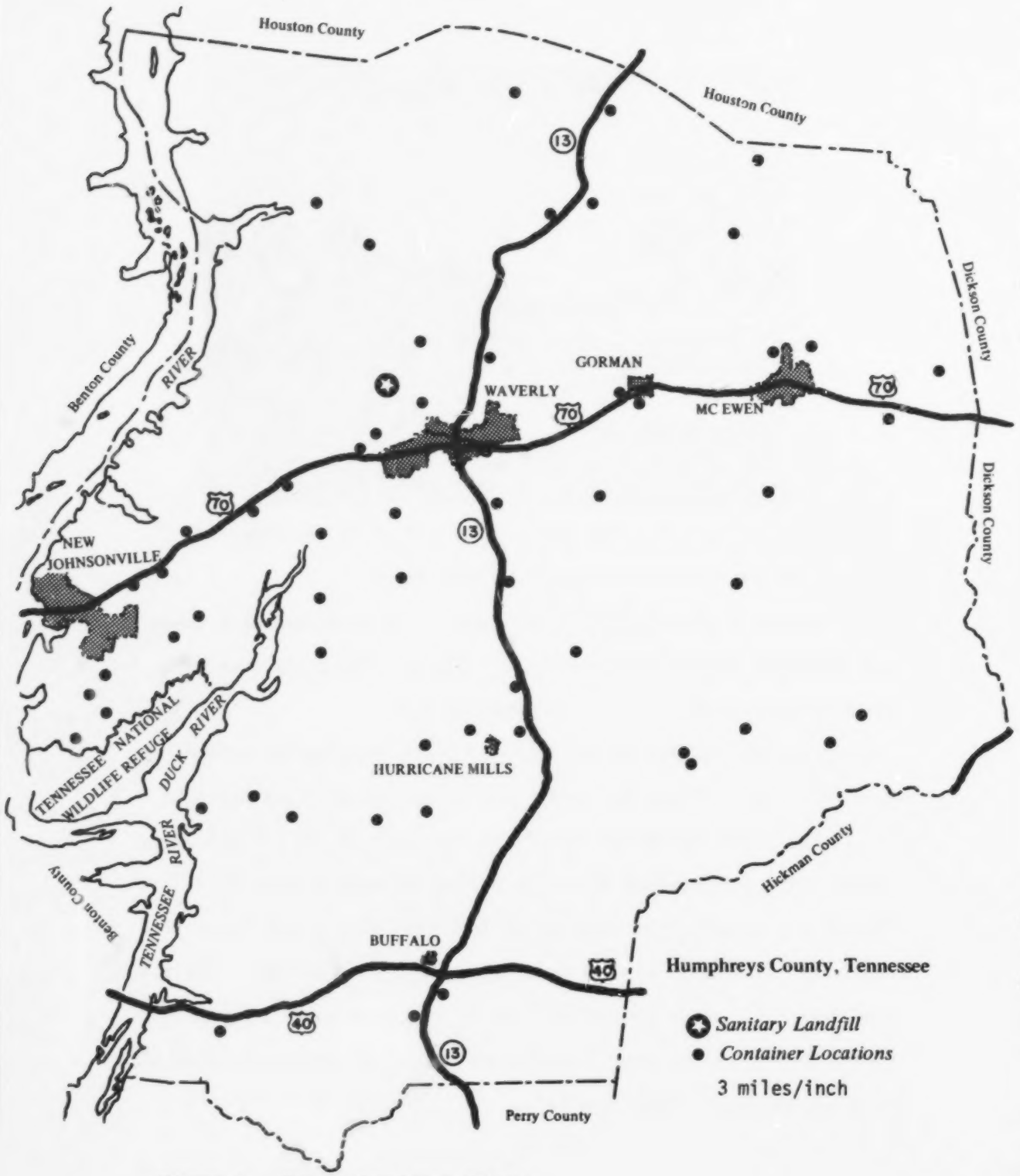

Figure 5. Map of Humphreys County

Figure 6. A six-cubic-yard container being emptied by the Humphreys County collection truck.

A detailed site and operational plan was prepared with State assistance. Geologic analysis, including test borings, was performed before the final selection of the sanitary landfill site was made. A State permit was issued for the sanitary landfill upon completion of the required analysis and plans.

City Participation in the System

Waverly (pop. 3,680) has a local collection service and began hauling directly to the new county sanitary landfill when the city dump was closed and covered. McEwen (pop. 1,500) closed and covered its open dump and uses 12 containers that were placed in a central container site. New Johnsonville (pop. 900) also closed and covered its open dump and now utilizes 14 containers at a central site. The container sites at McEwen and New Johnsonville are short-term solutions.

Proper rat poisoning was conducted at all sites during closure of the dumps. The apparent imbalance in the number of containers for McEwen and New Johnsonville can be explained by the location of other containers in the overall system.

Operating Costs and Calculations

Actual operating costs are shown for January through October 1971 (Table 2). Annual operating costs including amortization were projected (Table 3).

TABLE 2

ACTUAL OPERATING COSTS, JANUARY THROUGH OCTOBER 1971*

Item	Collection system	Sanitary landfill
Salaries†	$7,715	$7,945
Fuel and oil	1,480	743
Tires	2,046	--
Insurance	1,346	172
Repairs	801	375
Misc.	540	45
	$13,928	$9,280
Miles driven	37,215 mi.	--
Cost/mile	37¢	--

*Operating costs exclude amortization of capital costs.
†The accounting system was revised in this budget period, requiring some minor approximation of costs.

TABLE 3

PROJECTED ANNUAL OPERATING COSTS AND AMORTIZATION

	Container system	Sanitary landfill
Population served	9,250*	12,930
Estimated operating costs/year	$16,800	$11,100
Amortization costs†	$13,790	$ 8,025
Total operating costs per year	$30,590	$19,125
Total operating cost/person served/year	$ 3.31	$ 1.48
Estimated solid waste tonnage collected‡	4,220	8,260
Cost/ton	$ 7.25	$ 2.32

*Waverly's population (3,680) is not included since they receive municipal collection services.

†Amortization of the Container System = $58,091 X .2374 (crf - 6% - 5 years). Amortization of the sanitary landfill equipment = $30,613 X .2374 (crf - 6% - 5 years) + $8,685 X .08718 (crf - 6% - 5 years).

‡The estimated solid waste tonnage for the container system = 2.5 lbs/person/day X 9,250/2,000 X 365. The estimated solid waste tonnage disposed of at the sanitary landfill = 3.5 lbs/person/day X $\frac{12,930}{2,000}$ X 365.

Financing the System

The general fund of the county was used for the initial capital purchases. Judge Bradley disclosed that the capital costs would be distributed in the budget over several years. No State or Federal financial aid was used in the project.

The capital cost distribution among the various agencies was based on political compromise and on an acceptance by the county of all capital costs of the container collection system. Sanitary landfill capital costs ($39,318) were tentatively allocated on the basis of population.

The operating costs for the container collection system are borne by the county. The operating costs associated with the sanitary landfill are allocated on the basis of population. Unfortunately, a written agreement was not prepared for distributing the operating costs of the sanitary landfill between the cities and the county. Renegotiation of these costs has occurred.

Population was used as the primary criterion in the cost allocations, since it was considered to be the most equitable means available. Charges based on the weight of solid waste disposed of at the sanitary landfill were considered, but rejected.

Highlights

An outstanding feature of the Humphreys County solid waste management system has been excellent use of public relations, both to build support for the system before adoption and then to educate the public after the approval of the system. Visual aids, news releases and lectures all contributed to gaining the public's support for the project. Other features were the speed of implementation and the exclusive use of local funds. The credit for this project belongs to the county residents. The only outside aid enlisted for the project was technical assistance from the State's Solid Waste Management Section.

The overall aesthetic improvement that resulted from the project is the most visible effect. Three open burning dumps were closed, and about 40 roadside and promiscuous dumps were eliminated. One sanitary landfill that will ultimately become pasture land now handles the entire county's solid waste (Figure 7).

Figure 7. The mile-long entrance road to Humphreys County sanitary landfill was built as required by the lease in order to give access to the site.

However, two problem areas arose in developing the regional system. One of these was the lack of a formal agreement between the cities and the county to provide for the cost of sanitary landfill operations. The original solid waste study committee nearly erred when it sought equipment bids without the legal authority to do so. The County Sanitation Board was created to assume this responsibility within the framework of the County's legislation.

Figure 8. A trench that is being covered at Humphreys County sanitary landfill.

Conclusions

Efficient and acceptable solid waste management systems can be developed in rural areas without State or Federal financial aid. The Humphreys County system, utilizing container collection and a central sanitary landfill, is a prime example of a quality rural system.

The cost of this solid waste management system is most reasonable when compared to other services, like water pollution treatment. Open burning and promiscuous dumps were eliminated and replaced with a system that costs an estimated $4.79 per person served per year, including amortization of capital expenditures. The higher level of service now provided to the county's citizens has earned their strong support for this project.

Credits

1. Soil Conservation Service, U.S. Department of Agriculture.
2. Humphreys County Board of Sanitation, Brown Rochelle, Chairman.
3. Humphreys County Soil Conservation District.

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